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Lapprotector™ Use Decreases Incisional Wound Infections in Cases of Perforated Appendicitis: A Prospective Study

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OBJECTIVE: To examine whether Lapprotector™, a protective film and ring device for protecting wounds, can prevent wound infection after open appendectomy.
METHODS: We performed open appendectomy on 64 patients between 2004 and 2006. In September 2005, we started using Lapprotector™ to protect the site of incision (McBurney's point). Patients were divided into two groups as follows: Lapp(−), $n = 32$; Lapp(+), $n = 32$. Patient demographics were not statistically different and antibiotic protocols were identical.
RESULTS: In the Lapp(−) group, the appendix was perforated in seven patients (21.9%) and not perforated in 25 patients (78.1%). In the Lapp(+) group, the appendix was perforated in nine patients (28.1%) and not perforated in 23 patients (71.9%). For perforated cases, incisional wound infection was seen in three out of seven patients (42.9%) in the Lapp(−) group and in no patient (0%) in the Lapp(+) group, a significant difference ($p < 0.05$, χ^2 test). For nonperforated cases, wound infection was seen in only one out of 25 patients (4.0%) in the Lapp(−) group.
CONCLUSION: We recommend using Lapprotector™ to prevent incisional wound infection in patients requiring open appendectomy, especially in cases where the appendix is perforated. [*Asian J Surg* 2008; 31(3):101–3]

Key Words: appendicitis, appendectomy, paediatrics, surgical instruments, surgical wound infection

Introduction

Wound infection is the most frequent complication in children after open appendectomy.[1] Recently, the Lapprotector™ was developed for adult patients with colon cancer and gastric cancer to prevent tumour recurrence and infection of the mini-laparotomy incisional sites.[2] It is useful as a device, but has not been assessed in children.

This study was designed to examine if Lapprotector™ application to an incision site, in this case in open appendectomy in children, can prevent wound infection.

Patients and methods

We performed open appendectomy on 64 patients between 2004 and 2006. In September 2005, we started using Lapprotector™ to protect the incision site (Figure 1).

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Figure 1. Lapprotector™ protects the site of incision from an infected appendix.

Figure 2. Lapprotector™ allows easy exposure of the intra-abdominal cavity by pulling the outer rim of the ring as required.

Lapprotector™ (Hakko Shoji Co. Ltd., Tokyo, Japan) is a device designed to protect an incision site during surgery. It consists of two superflexible rings made from plastic material covered with polyurethane polyamide, and a thin silicone rubber membrane is attached to the outer rim of the two rings. If the two rings are pulled apart, the device becomes cylindrical. Furthermore, exposure can be improved by pulling the outer rim of the rings as required (Figure 2).

We used two types of Lapprotector™ depending on the size of the wound. One was a mini-type which can be used for wounds between 2 and 4 cm long and the other was a regular type for wounds between 3 and 6 cm long.

Subjects were divided into two groups according to Lapprotector™ use: Lapp(−), $n = 32$, and Lapp(+), $n = 32$. Age at appendectomy, type of appendicitis, and incidence of postoperative wound infection in each group were reviewed prospectively. Antibiotic protocols used in both groups were identical.[3]

Statistical analysis was performed using the χ^2 test and p values of less than 0.05 were considered significant.

Table. Comparison of Lapp(−) versus Lapp(+) in children with appendicitis*

	Lapp(−) ($n = 32$)	Lapp(+) ($n = 32$)	p
Age (yr)	9.3 ± 0.6	9.6 ± 0.5	NS
Appendicitis			
Nonperforated	25 (78.1)	23 (71.9)	NS
Perforated	7 (21.9)	9 (28.1)	NS
Wound infection			
Nonperforated	1 (4.0)	0 (0)	NS
Perforated	3 (42.9)	0 (0)	< 0.05

*Data presented as mean ± standard deviation or n (%). NS = not significant.

Results

Results are shown in the Table. Mean age at appendectomy in the Lapp(−) group was 9.3 ± 0.6 years and in the Lapp(+) group was 9.6 ± 0.5 years. This difference was not statistically significant. In Lapp(−), the appendix was perforated in seven patients (21.9%) and not perforated in 25 patients (78.1%). In Lapp(+), the appendix was perforated in nine patients (28.1%) and not perforated in 23 patients (71.9%). These differences from Lapp(−) were also not statistically significant. For perforated cases, incisional wound infection was seen in three out of seven patients (42.9%) in Lapp(−) and in no patient in Lapp(+), a significant difference ($p < 0.05$). For nonperforated cases, wound infection was seen in only one patient (4.0%) in the Lapp(−) group.

Discussion

The advantages of the Lapprotector™ are as follows: easy to use, safe—because it does not damage the surrounding tissue, provides a relatively wide, circular opening, and is able to protect the wound edge from infectious matter. In addition, it is available commercially in appropriate sizes.

Wound infection is the most common complication in children after open appendectomy, especially with perforated appendicitis.[4–6] In this study, the incidence of

wound infection in perforated cases in Lapp(–) was 42.9%, which was statistically significantly higher than that for Lapp(+). Our data suggest that Lapprotector™ is a useful device for preventing wound infection in perforated appendicitis. In nonperforated cases, wound infection was not seen in Lapp(+) and in only one patient in Lapp(–). Although the difference was not statistically significant, the infection occurred in a case of gangrenous appendix, which in hindsight could probably have been prevented using Lapprotector™.

We recommend using Lapprotector™ to prevent incisional wound infection in patients requiring open appendectomy, especially in cases where the appendix is perforated.

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